NATURAL RESOURCES CONSERVATION SERVICE
Wyoming
CONSTRUCTION SPECIFICATIONS
FOR
SUBSURFACE DRAIN

_____ (Owner/Operator)

_____ (Project/Title)

GENERAL

Installation shall be in accordance with a design and plan approved by the responsible technician. Details of construction shown in the design and plan but not included here shall be considered as a part of this specification. Construction activities shall be in accordance with applicable OSHA regulations and applicable flood plain ordinances.

CLEARING

A distance of 50 feet should be maintained from other species of trees except for fruit trees.

EXCAVATION

All trench installations should be made when the soil profile is in its driest possible condition in order to minimize problems of trench stability, conduit alignment, and soil movement into the drain. Provisions for safety during trenching operations shall be in compliance with the applicable OSHA safety and health regulations for construction.

The conduit shall not be placed on exposed rock or stones more than 1.5 inch in diameter. Where such conditions are present the trench must be over excavated a minimum of 6 inch and refilled to grade with a suitable bedding material. All conduits shall be laid to line and grade in such a way that the side walls are continuously and uniformly supported with suitable bedding material. Such material shall be properly placed and compacted to provide lateral restraint against deflection and to protect the conduit against collapse during backfilling.

Trench widths must be adequate for proper installation of the conduit, allow proper joining of sections, and allow proper placement of filter, envelope, or blinding materials. The trench bottom shall be constructed to proper grade before placement of the conduit.

The conduit must be place on a firm foundation to insure proper alignment. If installation will be below a water table or where unstable soils are present, special equipment, installation procedures, or bedding materials may be needed.

For trench bottom shall be shaped to fit the pipe circumference when a gravel filter or envelope is not specified. Refer to details Attachment 1.

PLACEMENT

Unless otherwise specified, the placement of the conduit will start at the downstream end and continue upslope. No reversal in the slope of the pipe shall be permitted.

Caps shall be installed on the upper end of all lines. All fittings shall be compatible with the pipe being used. Where prefabricated fittings are not available, handcut holes are acceptable provided care is taken when making the connection not to create a means for obstructing flow, catching debris, or allowing soil to enter the pipe line.

Pipe shall be blinded with filter or envelope or soil material as shown on the drawings. The conduit will be held in place until secured by fill materials.

Joints between non perforated drain pipe shall not exceed 1/8 in. except in sandy soils, where the closest possible fit must be obtained, and in organic soils where some of the more fibrous

types make it desirable to increase slightly the space between the pipe.

When work is temporarily stopped, the upstream end of the conduit shall be closed with a temporary screen or plug.

FILTER MATERIAL

If a sand-gravel filter is specified, the filter gradation shall be as noted on the drawings or as designated in the "ADDITIONAL SPECIFICATIONS".

Specified filter material must completely encase the conduit so that all openings are covered with at least 3 in. on filter material except that the top of the conduit and side filter material may be covered by a sheet of plastic or similar impervious material to reduce the quantity of filter material required.

Artificial fabric or mat-type filter materials when specified shall be of the opening size, strength, durability and permeability as noted on the drawings or as designated in the "ADDITIONAL SPECIFICATIONS".

ENVELOPE AND BLINDER MATERIAL

Envelope materials shall consist of sand-gravel, organic, or similar material, Sand-gravel envelope materials shall all pass a 1.5-inch sieve; not more than 30 percent shall pass a No. 60 sieve; and not more than 5 percent shall pass the No. 200 sieve. ASTM C 33 fine aggregate for concrete has been satisfactorily used for envelope material.

Where organic or other compressible materials are used, they shall be used only around a rigid wall conduit and above the centerline of flexible tubing. All organic or other compressible material shall be of a type that will not readily decompose.

Flexible conduit will be placed in such a way that maximum stretch does not exceed 5 percent.

For rigid conduits installed in a trench, the same requirements will be met except that a groove or notch is not required.

For trench installations where a sand-gravel or a compacted bedding is not specified, the conduit should be blinded with selected material containing no hard objects larger than 1.5 inches in diameter. Blinder should be carried to a minimum of 3 inches above the conduit.

Fittings shall be installed in accordance with instructions furnished by the manufacturers. Couplers are recommended at all joints and fittings, at all changes in direction (where the centerline radius is less than three times tubing diameter), at changes in diameter, and at junction with another line.

TRENCH BACKFILL

Backfill will be placed in such a manner as to avoid displacement of the conduit. Backfill should be moved into the trench at an angle so that material flows down the front slope of previously placed material. Backfill shall not contain frozen material, stones, clods, or objects large enough to damage the conduit. The trench should be backfilled as soon as possible after blinding. When installing flexible tubing on a hot day, backfilling should be delayed until tubing temperature cools to the soil temperature.

PIPE MATERIALS

The conduit shall be of the size(s), material, type and quality as shown on the drawings. All pipe shall meet or exceed the minimum requirements indicated for the respective pipe materials.

Corrugated polyethylene (PE) pipe shall conform to the requirements of ASTM F 405, F 667 or F 894 or to the requirements of AASHTO M252 or M294.

Polyvinyl chloride (PVC) pipe shall conform to the requirements of ASTM D 2665, D 3034, F 679, F 758, F 789, F 794 or F 949.

Acrylonitrile-Butadiene-Styrene (ABS) pipe shall conform to the requirements of ASTM D2661 or D 2751.

Corrugated metal pipe shall conform to the requirements of ASTM A 760 or A 762 for steel pipe and to ASTM B 745 for aluminum pipe.

Concrete pipe shall conform to the requirements of ASTM C 14, C 76, C 118 or C 412. Bell and spigot, tongue and groove, and other types of

pipe that meet the strength, absorption and other requirements of concrete pipe as specified in the preceding ASTM's, except for minor imperfections in the bell, the spigot tongue, or the groove, and ordinarily classed by the industry as "seconds," may be used for drainage conduits, provided that the pipe is otherwise adequate for the job.

Where perforated conduit is required, the water inlet area shall be at least 1 square inch/foot of conduit length. Round perforations shall not exceed 3/16-inch in diameter except where filters, envelopes, or other protection is provided or for organic soils, where a maximum hole diameter of ½ inch may be used. Slotted perforations shall not exceed 1/8 inch in width.

STRUCTURES

Manholes, drop inlets, outlets and other structures shall be constructed at the locations, of the materials and to the lines and grades as shown on the drawings.

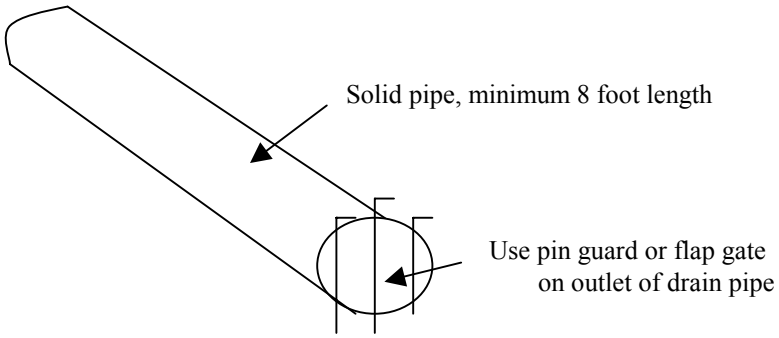
The outlet shall be protected against erosion and undermining of the conduit, entry of tree roots, damaging periods of submergence, and entry of rodents or other animals into the subsurface drain. A continuous section of rigid pipe without open joints or perforations will be used at the outlet end of the line and must discharge above the normal elevation of low flow in the outlet ditch.

The outlet pipe and its installation will conform to the following requirements:

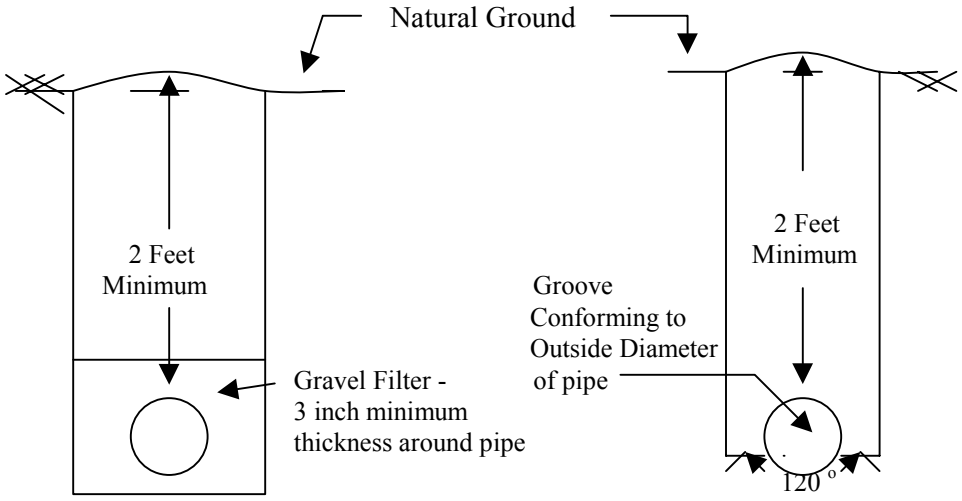
1. If burning vegetation on the outlet ditch band is likely to create a fire hazard the material from which the outlet pipe is fabricated must be fire resistant.
2. On cantilever outlets two-thirds of the pipe will be buried in the ditch bank, and the cantilever section must extend to the toe of the ditch side slope or the side slope protected from erosion.
3. The minimum length of the pipe will be 8 feet unless otherwise noted on the drawings.

ADDITIONAL SPECIFICATIONS

ATTACHMENT 1



TYPICAL RODENT GUARD
AT PIPE OUTLET



TYPICAL TRENCH X-SECTION
GRAVEL FILTER REQUIRED

TYPICAL TRENCH X-SECTION
GRAVEL FILTER NOT REQUIRED

TYPE OF PIPE _____

DIAMETER OF PIPE _____